



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/671,536	09/27/2000	Paul Alexander	POM-10902/29	6709

7590 02/12/2004

John G Posa Esq
Gifford Krass Groh Sprinkle
Anderson & Citkowski PC
280 N Old Woodward Ave Suite 400
Birmingham, MI 48009

EXAMINER

CABRERA, ZOILA E

ART UNIT	PAPER NUMBER
----------	--------------

2125

DATE MAILED: 02/12/2004

5

Please find below and/or attached an Office communication concerning this application or proceeding.

PRG

Office Action Summary

Application No.

09/671,536

Applicant(s)

ALEXANDER, PAUL

Examiner

Zoila E. Cabrera

Art Unit

2125

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Rock et al. (US 5,555,481)** in view of **Hanratty (US 5,990,897)**.

Rock discloses a method of modeling a tool path in an additive manufacturing process enabling multi-material parts to be fabricated without material interference (Fig. 4), the method comprising the steps of:

- separately modeling each material as a single or multiple solid part under the assumption that multiple materials or voids are not present (Fig. 4; Col. 7, lines 14-26; Col. 5, lines 65-67); ordering the parts from the outermost geometry to the innermost geometry (Fig. 3, i.e., first layer corresponds to the outermost geometry and subsequent layers correspond to the innermost geometry).

Regarding claims 2-3, and 5, **Rock** further discloses,

- all of the steps are carried out using a CAD system limited to single-material designs (Col. 9, lines 14-17 and lines 40-42);
- the tool path is a spiral-in, spiral-out, arbitrary direction raster path, or a combination thereof (Fig. 9; Col. 9, lines 14-17);

- the step of embedding commands as appropriate to accommodate closed- or open-loop control over the fabrication process (Fig. 5).

However, **Rock** does not disclose, regarding claim 1, performing Boolean operations on the ordered parts to calculate the final volume for each part. But **Hanratty** discloses a method for automatically generating a three-dimensional geometric solid wherein it is disclosed that Boolean operations are performed for calculating the final volume of a part (Col. 1, lines 35-50). Therefore, it would have been obvious to a person of the ordinary skill in the art at the time the invention was made to combine the teachings of **Rock** with **Hanratty** because it would provide with a simple system for modeling a three-dimensional object by using well known Boolean operations for realizing the volume of a part as taught by **Hanratty** (Col. 1, lines 35-50).

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Rock et al. (US 5,555,481)** and **Hanratty (US 5,990,897)** as applied to claim 1 above, and further in view of **Mazumder et al. (US 6,410,105)**.

Rock and **Hanratty** disclose the limitations of claim 1 above but fail to disclose the step of reflecting the geometries to accommodate overhang or undercut features. However, **Mazumder** discloses a system for the fabrication of overhangs, undercuts and three-dimensional structures integrated into the body of molds using a direct metal deposition process (Col. 2, lines 48-50). Therefore, it would have been obvious to a person of the ordinary skill in the art at the time the invention was made to combine the teachings of **Rock** and **Hanratty** with the system of **Mazumder** because it would

Art Unit: 2125

provide an improved system wherein cooling channels and other features, which are part of the geometry or structure of the article, including holes, cavities, discontinuities, steps, corners and so forth, are created during the same DMD fabrication process.

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Rock et al. (US 5,555,481)** and **(US 5,990,897)** as applied to claim 1 above, and further in view of **Hanna et al. (US 6,574,523)**.

Rock and **Hanratty** disclose the limitations of claim 1 above but fail to disclose the steps of: generating multiple tool paths; and merging the toolpaths into a single toolpath file. However, **Hanna** discloses the generation of multiple tool paths and merging the toolpath into a single toolpath file (Col.11, lines 16-27 and lines 36-42). Therefore, it would have been obvious to a person of the ordinary skill in the art at the time the invention was made to combine the teachings of **Rock** and **Hanratty** with the teachings of **Hanna** because it would provide with an improved system wherein each area of the model that requires a specific property is separated out into its own unique file and thereafter merge all the files that make up the complete model (Col. 11, lines 16-18 and lines 22-25).

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

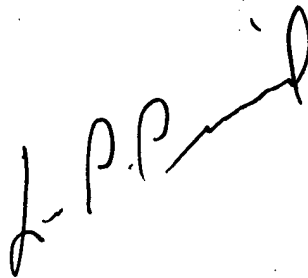
Any inquiry concerning communication or earlier communication from the examiner should be directed to Zoila Cabrera, whose telephone number is (703) 306-

Art Unit: 2125

4768. The examiner can normally be reached on M-F from 8:00 a.m. to 5:30 p.m. EST (every other Friday).

If attempts to reach the examiner by phone fail, the examiner's supervisor, Leo Picard, can be reached on (703) 308-0538. Additionally, the fax phones for Art Unit 2125 are (703) 872-9306. Any inquiry of a general nature or relating to the status of this application should be directed to the group receptionist at (703) 305-9600.

Zoila Cabrera
Patent Examiner
2/5/04

A handwritten signature in black ink, appearing to read 'L. Picard', written diagonally across the page.

LEO PICARD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100